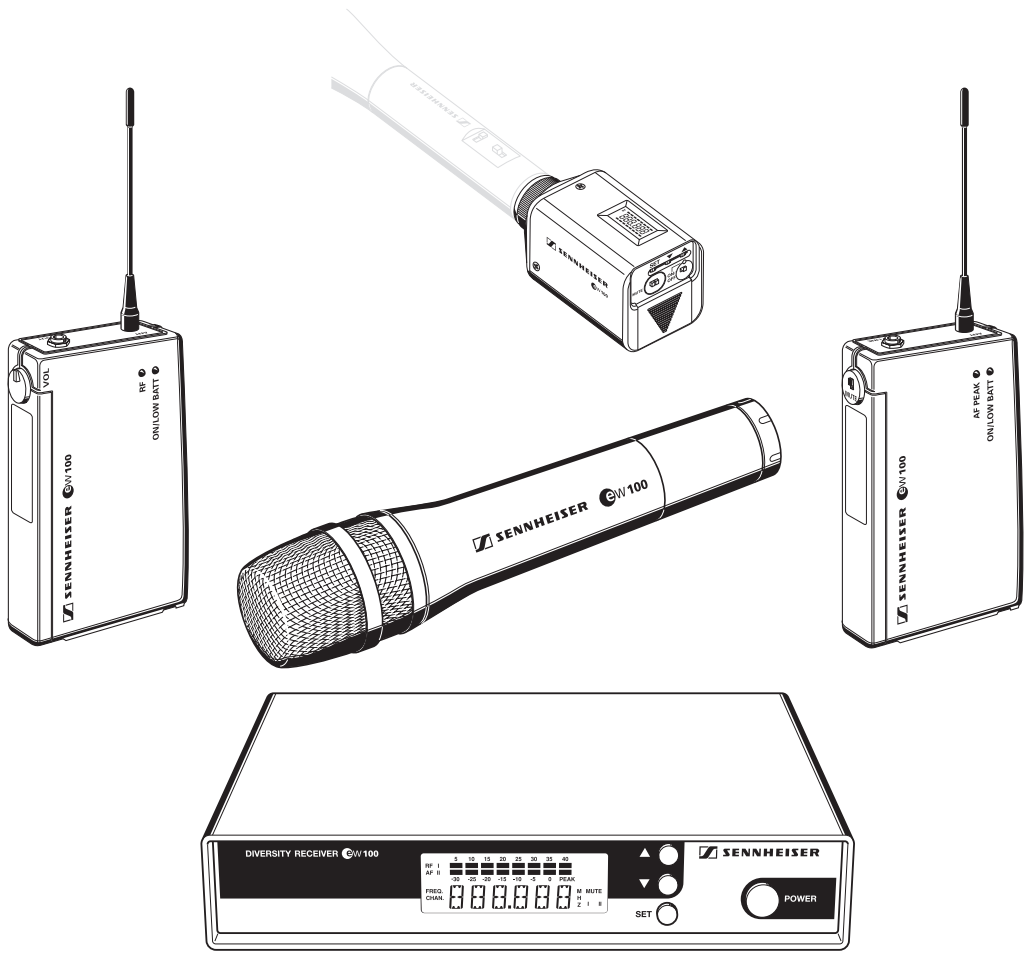
INSTRUCTION MANUAL

evolution wireless Series
ew 100



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Thank you for choosing Sennheiser!

We have designed these products to give you reliable operation over many years.

Please take a few moments to read these instructions carefully, as we want you to enjoy your new Sennheiser products quickly and to the full.

2 Short description

With the evolution wireless series ew 100, Sennheiser offers musicians, video and sound amateurs high-quality state-of-the-art RF transmission systems with a high level of operational reliability and ease of use. Transmitters and receivers permit wireless transmission with studio-quality sound. Due to further optimised PLL and microprocessor technology, the **HDX** noise reduction system and true diversity technology (not pocket receivers), these transmission systems ensure interference-free transmission and minimise dropouts in the RF link.

The systems can be supplied in five frequency ranges within the UHF band. Please note: Frequency usage is different for each country. Your Sennheiser agent will have all the necessary details on the available legal frequencies for your area.

Range A: 518 – 550 MHz,
Range B: 630 – 662 MHz,
Range C: 740 – 772 MHz,
Range D: 790 – 822 MHz,
Range E: 838 – 870 MHz.

ew 100 transmitters and receivers are 4-channel switchable. Each transmitter and receiver has 4 frequency memories to store up to 4 transmission/receiving frequencies. The frequencies are selectable in 25-kHz steps, giving a selection of 1280 frequencies within the preset 32 MHz frequency range.

Each system has 4 factory-preprogrammed frequencies, so that
- the systems are ready for immediate use after switch-on,
- several systems can be operated simultaneously on the factory-preset transmission and receiving frequencies without causing intermodulation interference. However, all frequency settings can be changed to your individual needs, if required.

Each system consists of
- a receiver (mains or pocket),
- a hand-held/pocket/plug-on transmitter and
- comes complete with all necessary accessories.

3 Important notes

Never open electronic devices! This must only be done by authorised personnel and is all the more important for units connected to AC outlets. If devices are opened by customers in breach of this instruction, the warranty is voided.

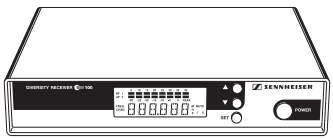
Always disconnect the devices from the mains by removing the plug when you wish to change connections or move the devices to a different place.

Keep the devices away from central heating radiators and electric heaters. Never expose them to direct sunlight.

Use the devices in dry rooms only.

Use a damp cloth for cleaning the devices. Do not use any cleansing agents or solvents.

4 System variants



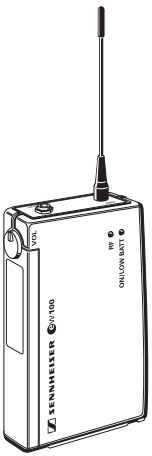
EM 100

Set ew 101

This is a versatile system suitable for many applications. The plug-on transmitter converts a standard wired microphone into a radiomicrophone. Set ew 101 consists of: EM 100 receiver, SKP 100 plug-on transmitter, plug-in mains unit, battery, antennas and operating manual.

Set ew 101-p

Having the same transmitter as the Set ew 101, this system replaces the mains receiver with a pocket receiver for camera-mounted applications.
Set ew 101-p consists of: EK 100 pocket receiver, SKP 100 plug-on transmitter, two batteries, antennas, line output cable, camera kit and operating manual.



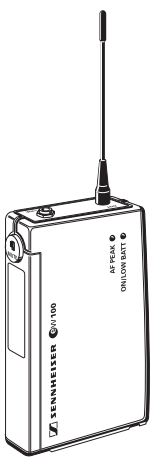
EK 100

Set ew 112

This system is ideal for theatre and presentation use. The unobtrusive clip-on microphone is virtually invisible, and its omni-directional pattern minimises drop-outs caused by the speaker turning his/her head.
Set ew 112 consists of: EM 100 receiver, SK 100 pocket transmitter, ME 2 miniature clip-on omni-directional condenser microphone, plug-in mains unit, battery, antennas and operating manual.

Set ew 112-p

Having the same transmitter as the Set ew 112, this system replaces the mains receiver with a pocket receiver for camera-mounted applications.
Set ew 112-p consists of: EK 100 pocket receiver, SK 100 pocket transmitter, ME 2 miniature clip-on omni-directional condenser microphone, two batteries, antennas, line output cable, camera kit and operating manual.



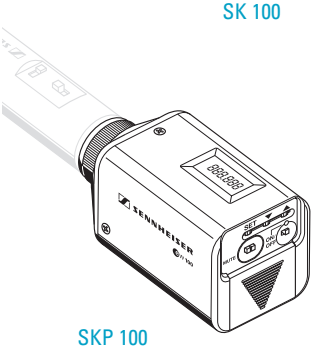
SK 100

Set ew 122

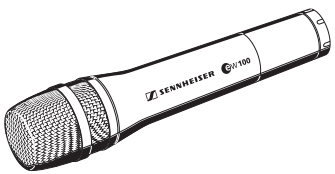
This system is ideal for presentation and PA applications in acoustically difficult rooms. The unobtrusive cardioid clip-on microphone can be directed towards the speaker's mouth.
Set ew 122 consists of: EM 100 receiver, SK 100 pocket transmitter, ME 4 miniature clip-on cardioid condenser microphone, plug-in mains unit, battery, antennas and operating manual.

Set ew 122-p

Having the same transmitter as the Set ew 122, this system replaces the mains receiver with a pocket receiver for camera-mounted applications.
Set ew 122-p consists of: EK 100 pocket receiver, SK 100 pocket transmitter, ME 4 miniatureclip-on cardioid condenser microphone, two batteries, antennas, line output cable, camera kit and operating manual.



SKP 100



SKM 100

Set ew 135

This system is ideal for vocal applications.
Set ew 135 consists of: EM 100 receiver, SKM 100 hand-held transmitter with MD 835 cardioid dynamic microphone module, plug-in mains unit, battery, antennas, microphone clamp and operating manual.

Set ew 135-p

Having the same transmitter as the Set ew 135, this system replaces the mains receiver with a pocket receiver for camera-mounted applications.
Set ew 135-p consists of: EK 100 pocket receiver, SKM 100 hand-held transmitter with MD 835 cardioid dynamic microphone module, two batteries, antennas, line output cable, camera kit, microphone clamp and operating manual.

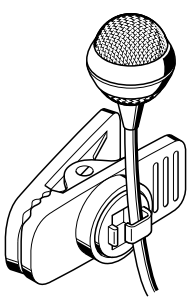
ME 2 omni-directional clip-on microphone with microphone clip

Set ew 145

This system is ideal for vocal applications in venues with high ambient noise levels. The super-cardioid dynamic microphone head has excellent feedback rejection.
Set ew 145 consists of: EM 100 receiver, SKM 100 hand-held transmitter with MD 845 super-cardioid dynamic microphone module, plug-in mains unit, battery, antennas, microphone clamp and operating manual.

Set ew 145-p

Having the same transmitter as the Set ew 145, this system replaces the mains receiver with a pocket receiver for camera-mounted applications.
Set ew 145-p consists of: EK 100 pocket receiver, SKM 100 hand-held transmitter with MD 845 super-cardioid dynamic microphone module, two batteries, antennas, line output cable, camera kit, microphone clamp and operating manual.



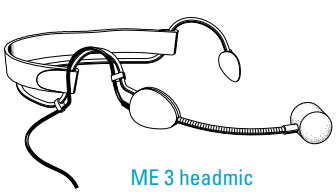
ME 4 cardioid clip-on microphone with microphone clip

Set ew 152

This system is ideal for hands-free vocal applications. Supplied complete with the ME 3 headmic (which has superb feedback rejection), this system gives complete freedom of expression to stage vocalists as well as proving a boon to sports commentators/referees and aerobic instructors.
Set ew 152 consists of: EM 100 receiver, SK 100 pocket transmitter, ME 3 condenser super-cardioid headmic, plug-in mains unit, battery, antennas and operating manual.

Set ew 152-p

Having the same transmitter as the Set ew 152, this system replaces the mains receiver with a pocket receiver for camera-mounted applications.
Set ew 152-p consists of: EK 100 pocket receiver, SK 100 pocket transmitter, ME 3 condenser super-cardioid headmic, two batteries, antennas, line output cable, camera kit and operating manual.



ME 3 headmic

Set ew 165

This system, due to its excellent feedback rejection and wide dynamic range, is the ideal choice for vocals and presentations.
Set ew 165 consists of: EM 100 receiver, SKM 100 hand-held transmitter with ME 865 super-cardioid condenser microphone module, plug-in mains unit, battery, antennas, microphone clamp and operating manual.

Set ew 165-p

Having the same transmitter as the Set ew 165, this system replaces the mains receiver with a pocket receiver for camera-mounted applications.
Set ew 165-p consists of: EK 100 pocket receiver, SKM 100 hand-held transmitter with ME 865 super-cardioid condenser microphone module, two batteries, antennas, line output cable, camera kit, microphone clamp and operating manual.

Set ew 172

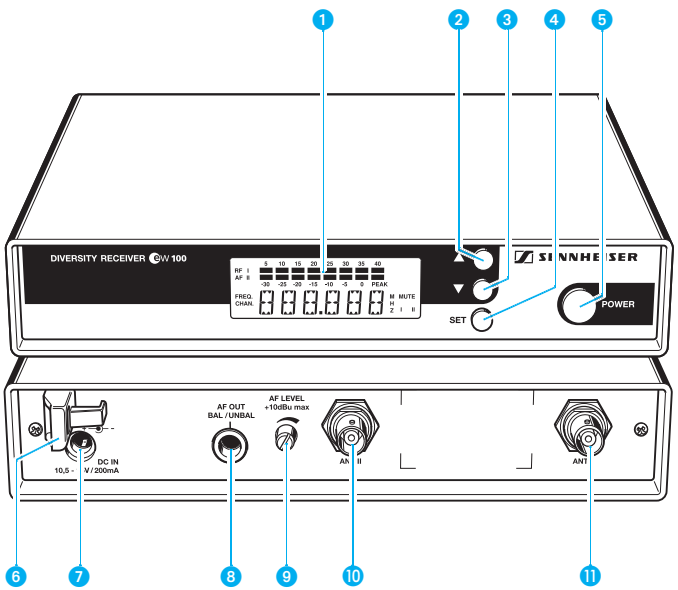
This system is for connecting musical instruments (e.g. guitar) which have a $^1/_4$" (6.3 mm) jack socket directly to the pocket transmitter.
Set ew 172 consists of: EM 100 receiver, SK 100 pocket transmitter, CI 1 instrument (guitar) cable, plug-in mains unit, battery, antennas and operating manual.

Set ew 172-p

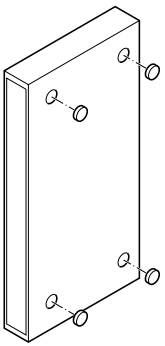
Having the same transmitter as the Set ew 172, this system replaces the mains receiver with a pocket receiver for camera-mounted applications.
Set ew 172-p consists of: EK 100 pocket receiver, SK 100 pocket transmitter, CI 1 instrument (guitar) cable, two batteries, antennas, line output cable, camera kit and operating manual.

5 Preparing the devices for use

EM 100 receiver



1. LC display
2. ▲ button (UP)
3. ▼ button (DOWN)
4. SET button
5. POWER (ON/OFF) button
6. Cable grip for power supply DC cable
7. DC socket for connection of mains unit (DC-IN)
8. AF output, $^1/_4$" (6.3 mm) jack socket (AF OUT BAL/UNBAL)
9. AF output level control (AF LEVEL)
10. Antenna input II (ANT II), BNC socket
11. Antenna input I (ANT I), BNC socket



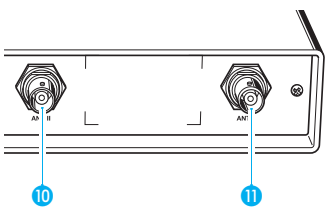
Mounting the rubber feet

To ensure that the receiver cannot slip on the surface on which it is placed, four self-adhesive soft rubber feet are supplied. These feet are stuck into the recesses on the bottom side of the receiver. (N.B.: Do not use these feet if rackmounting the receiver).

► Ensure that the recesses are clean and free from grease before fixing the feet.

Attention!

Some furniture surfaces have been treated with varnish, polish or synthetics which might cause stains when they come into contact with other synthetics. Despite a thorough testing of the synthetics used by us, we cannot rule out the possibility of discolouration, since we don't know your furniture. You should therefore always place the receiver on a non-slip pad.



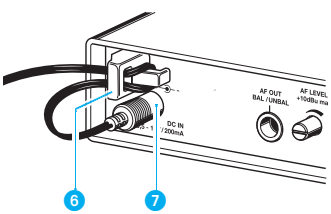
Connecting the antennas

The EM 100 receiver can be used with either telescopic antennas (supplied) or remote antennas (available as accessories).

The supplied telescopic antennas can be mounted quickly and easily to the rear of the receiver and are suitable for all applications where – good reception conditions provided – a wireless transmission system is to be used without a large amount of installation work.

► Connect the telescopic antennas to BNC sockets 10 and 11 at the rear of the receiver. Pull the antennas out and align them upwards in a V-shape.

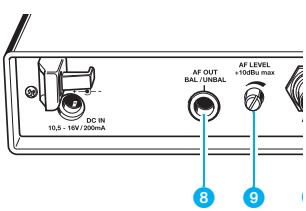
If the receiver position is not the best antenna position for optimum reception, you can use remote antennas. These are available as accessories.



Connecting the mains unit

► Insert the DC connector on the power supply output cable into socket 7 at the rear of the receiver.

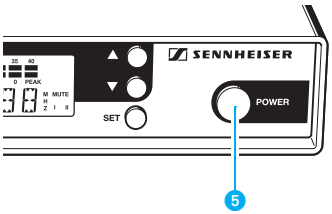
► Pass the cable through the cable grip 6.



Connecting the amplifier/mixing console

► Connect the amplifier/mixing console to the $^1/_4$" (6.3 mm) jack socket 8.

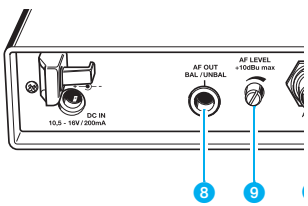
For information on balanced and unbalanced connection, please refer to the chapter "9 Overview".



Switching the receiver on/off

- ► Press the POWER button 5 to switch the receiver on.
- ► To switch the receiver off, press the POWER button until "OFF" appears on the display. You can then release the button.

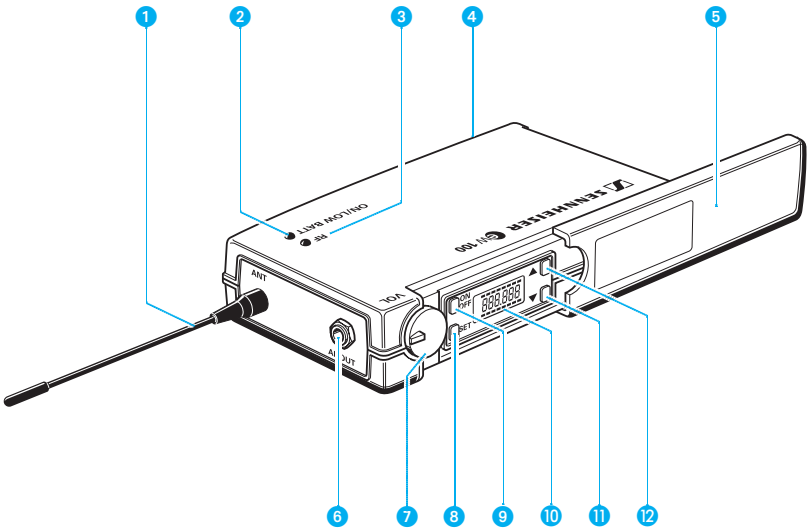
After a power failure, the device returns to the previous setting (ON/OFF).



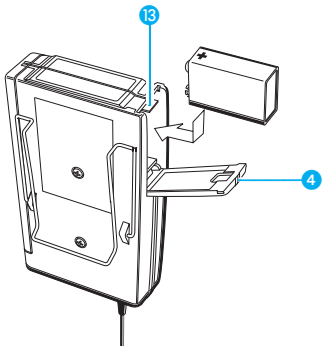
Adjusting the AF output level

- ► Use the AF output level control 9 to adjust the AF signal level that appears at output 8.

EK 100 pocket receiver



1. Antenna
2. Red LED for operation and battery status indication (ON/LOW BAT)
3. Green LED for RF signal indication (RF)
4. Cover plate for battery compartment
5. Cover plate for display and operating controls
6. AF output (AF OUT), 3.5 mm jack socket
7. AF output level control
8. SET button
9. ON/OFF button
10. LC display
11. ▼ button (DOWN)
12. ▲ button (UP)

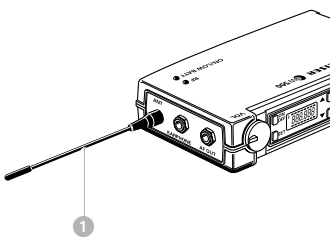


Inserting and changing the battery

- Slide the cover of the battery compartment 4 in the direction of the embossed arrow until it clicks audibly.
- Open the cover.
- Insert the 9 V PP3 battery (IEC 6 LR 61). Please observe correct polarity when inserting the battery.
- Close the battery compartment.
- To remove the battery, push the small red lever 13 in the battery compartment towards the bottom side of the receiver.

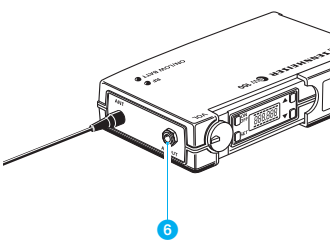
Note:

We recommend powering the receiver by a standard PP3 alkaline battery. If powered by a rechargeable 9 V battery, the operating time will be drastically reduced.



Connecting the antenna

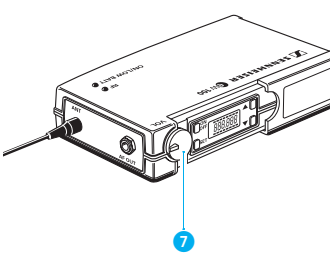
- Screw the antenna 1 onto the antenna socket (M3 connection).



Connecting sound recording and reproducing equipment

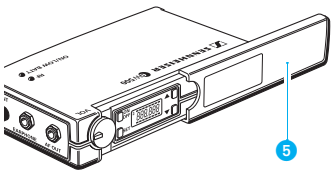
Sound recording and reproducing equipment such as amplifiers, video cameras, tape recorders etc. can be connected to the EK 100 receiver.

- Use the supplied line cable with 3.5 mm jack plug to connect the sound recording or reproducing device to the line output (AF OUT) 6.
- Lock the jack plug by screwing down the locking ring.



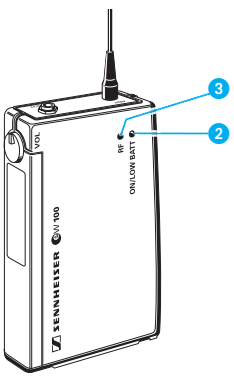
Adjusting the AF output level

Use the AF output level control 7 to adjust the AF signal level for socket 6.



Switching the receiver on/off

- ► Slide back the cover plate 5.
- ► Press the ON/OFF button to switch the receiver on. The red LED lights up.
- ► To switch the receiver off, press the ON/OFF button until "OFF" appears on the display. You can then release the button. The red LED goes off.



Signal and battery status indication

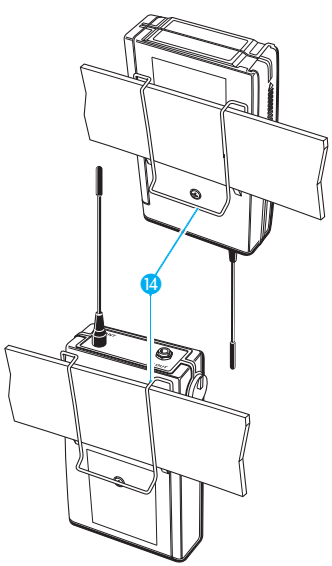
The green LED 3 at the top of the EK 100 receiver indicates that an RF signal is being received.

Battery status indication

The red LED 2 provides information on the (remaining) battery capacity:

LED lit up:
The receiver is switched on and the battery capacity is sufficient.

LED flashing:
The battery is going flat! You should immediately replace the battery.



Attachment of the receiver to clothing

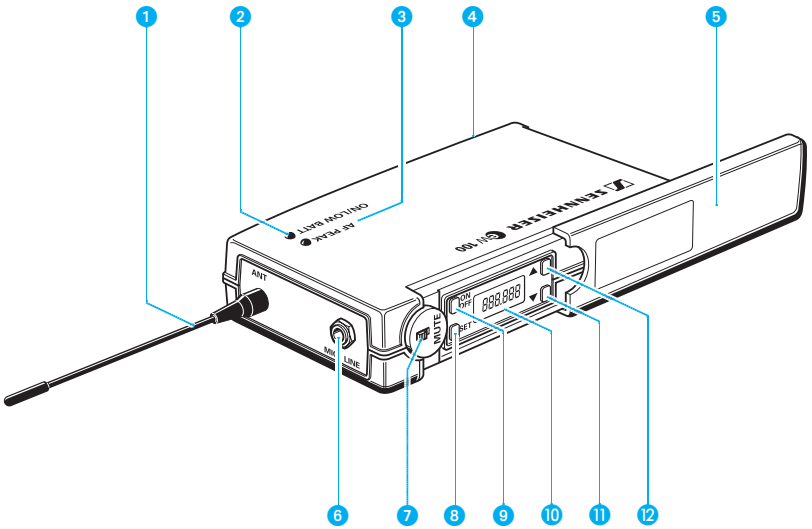
The EK 100 receiver is best attached to e.g. the belt with clip 14.

The clip is detachable so that you can also attach the receiver with the antenna pointing downwards. To do so, withdraw the clip from its fixing points and attach it the other way round.

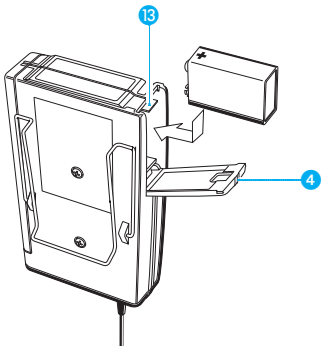
Attachment of the receiver to a camera

Use the supplied camera kit (self-adhesive Velcro tape) to attach the receiver to a camera. Remove the clip 14 and stick the Velcro tape to the receiver and the camera. Ensure that the surfaces are clean and free from grease.
(Note: We would suggest using the "hook" Velcro on the receiver and the "loop" Velcro on the camera.)

SK 100 pocket transmitter



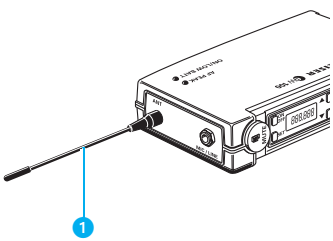
1. Antenna
2. Red LED for operation and battery status indication (ON/LOW BAT)
3. Yellow LED for AF peak (AF PEAK)
4. Cover plate for battery compartment
5. Cover plate for display and operating controls
6. AF input (MIC/LINE), 3.5 mm jack socket
7. MUTE switch
8. SET button
9. ON/OFF button
10. Display
11. ▼ button (DOWN)
12. ▲ button (UP)



Inserting and changing the battery

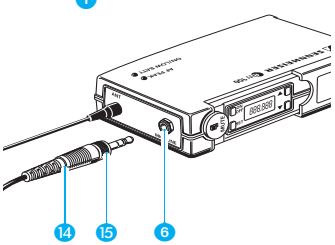
- Slide the cover of the battery compartment 4 in the direction of the embossed arrow until it clicks audibly.
- Open the cover.
- Insert the 9 V PP3 battery (IEC 6 LR 61). Please observe correct polarity when inserting the battery.
- Close the battery compartment.
- To remove the battery, push the small red lever 13 in the battery compartment towards the bottom side of the transmitter.

Note:
We recommend powering the transmitter by a standard PP3 alkaline battery. If powered by a rechargeable 9 V battery, the operating time will be drastically reduced.



Connecting the antenna

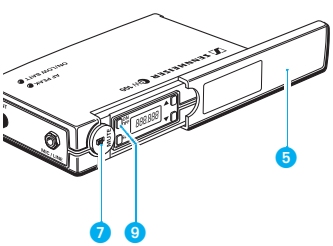
- Screw the antenna 1 onto the antenna socket (M3 connection).



Connecting the microphone/line cable

Electret powering ("plug-in" power) is available at the AF input for powering the microphone.

- Connect the 3.5 mm jack plug 14 from the microphone/line cable to the AF input (MIC/LINE) 6.
- Lock the jack plug by screwing down the locking ring 15.

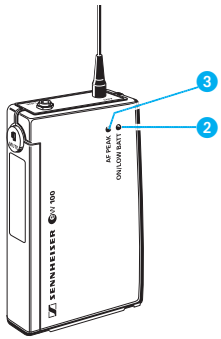


Switching the transmitter on/off

- Slide back the cover plate 5.
- Press the ON/OFF button 9 to switch the transmitter on. The red LED lights up.
- To switch the transmitter off, press the ON/OFF button until "OFF" appears on the display. You can then release the button. The red LED goes off.

Muting the transmitter

Use the MUTE switch 7 to noiselessly mute the transmitter's audio signal (this switch does **not** switch off the transmitter).



Signal and battery status indication

The yellow LED 3 at the top of the SK 100 transmitter lights up if the audio signal at the AF input is excessively high (AF peak).

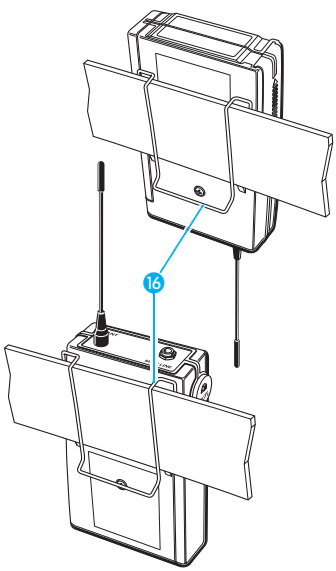
The red LED 2 provides information on the battery status:

LED lit up:

The transmitter is switched on and the battery capacity is sufficient.

LED flashing:

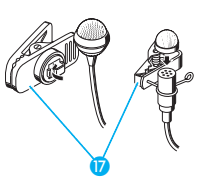
The battery is going flat! You should immediately replace the battery.



Attachment of the transmitter to clothing

The SK 100 transmitter is best attached to e.g. the belt with clip 16.

The clip is detachable so that you can also attach the transmitter with the antenna pointing downwards. To do so, withdraw the clip from its fixing points and attach it the other way round.



Attachment of the microphones

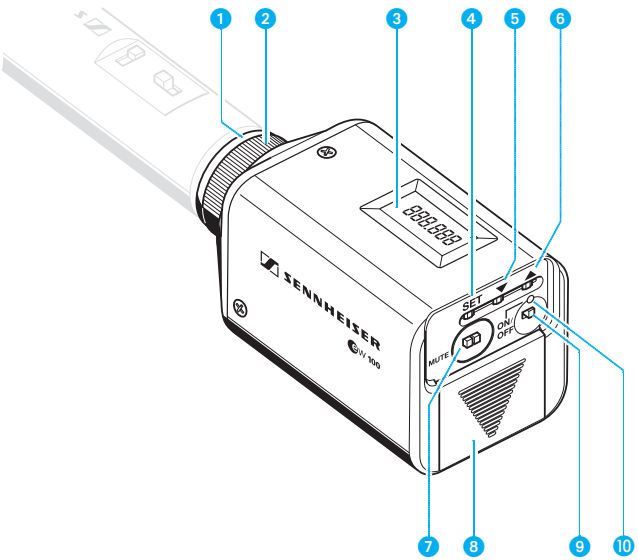
The microphone clips 17 enable the attachment of the ME 2 and ME 4 clip-on microphones to clothing (e.g. tie, lapel).

The ME 3 headmic is adjustable to comfortably and securely fit your head.

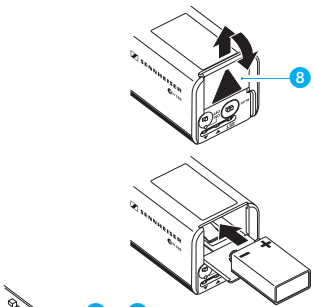
Positioning the microphones

The ME 3 and ME 4 microphones are directional microphones, i.e. their sound inlet should always be directed towards the sound source (e.g. mouth). The ME 2 with omni-directional pick-up pattern picks up sound equally from all directions. It is the best choice if movements of the speaker's head have to be compensated for.

SKP 100 plug-on transmitter

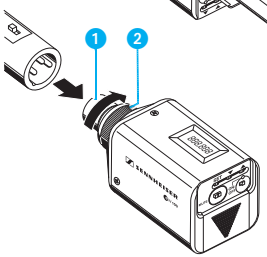


1. Microphone input, XLR-3 socket
2. Mechanical locking ring of XLR-3 socket
3. LC display
4. SET button
5. ▼ button (DOWN)
6. ▲ button (UP
7. MUTE switch
8. Battery compartment
9. ON/OFF button
10. Red LED for operation and battery status indication



Inserting and changing the battery

- ▶ Slide the cover of the battery compartment (8) in the direction of the arrow until it clicks audibly and open the cover.
- ▶ Insert the 9 V PP3 battery (IEC 6 LR 61). Please observe correct polarity when inserting the battery.
- ▶ Close the battery compartment.

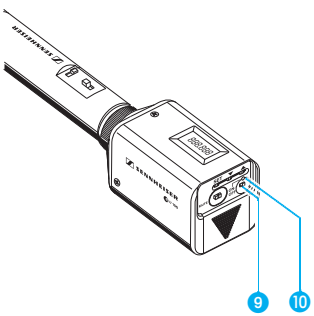


Plugging the transmitter onto the microphone

- ▶ Plug the transmitter's XLR-3 connector (1) onto the microphone's XLR-3 socket.
- ▶ Tighten the locking ring (2).

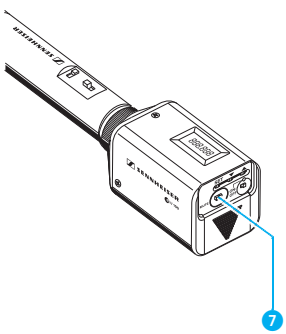
Note:

The transmitter uses the microphone body as an antenna – therefore only microphones with a metal casing should be used for best signal transmission.



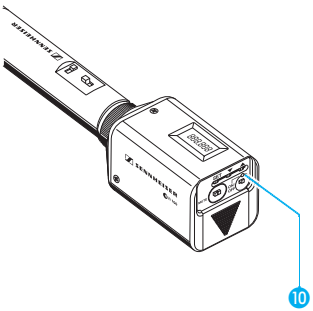
Switching the transmitter on/off

- ▶ Press the ON/OFF button (9) to switch the transmitter on. The red LED (10) lights up.
- ▶ To switch the transmitter off, press the ON/OFF button until "OFF" appears on the display. You can then release the button. The red LED goes off.



Muting the transmitter

Use the MUTE switch (7) to noiselessly mute the transmitter's audio signal (this switch does **not** switch off the transmitter).



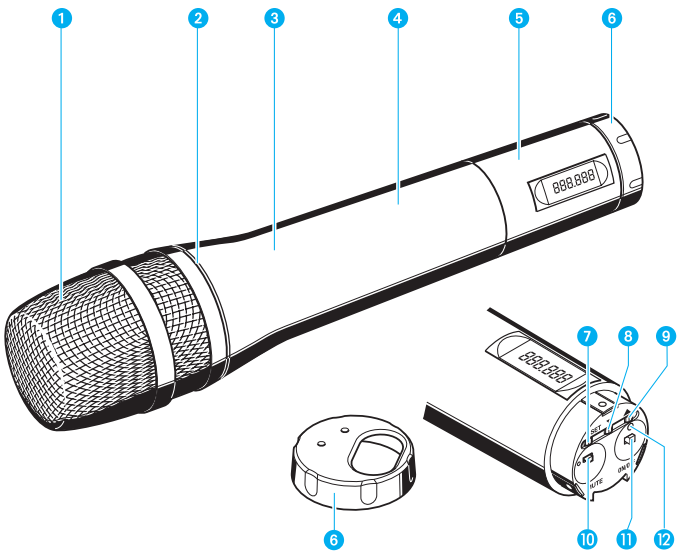
Battery status indication

The red LED 10 provides information on the (remaining) battery capacity:

LED lit up:
The transmitter is switched on and the battery capacity is sufficient.

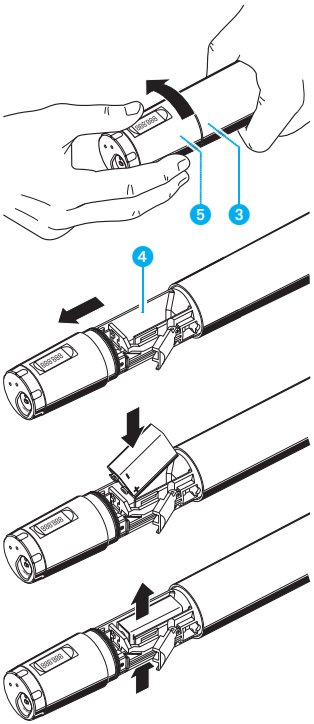
LED flashing:
The battery is going flat! You should immediately replace the battery

SKM 100 hand-held transmitter



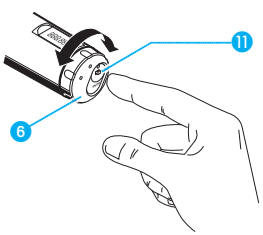
1. Sound inlet basket
2. Colour-coded identification ring for microphone modules
   green: MD 835 microphone module (cardioid dynamic microphone)
   blue: MD 845 microphone module (super-cardioid dynamic microphone)
   red: ME 865 microphone module (super-cardioid condenser microphone)
3. Body of hand-held transmitter
4. Battery compartment
5. Display section
6. Turnable protective cap for operating controls (shown removed)

   The following operating controls become accessible in turn by turning the protective cap 6:
7. SET button
8. ▼ button (DOWN)
9. ▲ button (UP)
10. MUTE switch
11. ON/OFF button
12. Red LED for operation and battery status indication



Inserting and changing the battery

- Unscrew the display section 5 by turning it counter-clockwise.
- Slide back the display section 5 until the battery compartment 4 becomes fully accessible.
- Insert the 9 V PP3 battery (IEC 6 LR 61). Please observe correct polarity when inserting the battery.
- Push the the battery compartment into the radiomicrophone's body.
- Screw the display section tight.
- To change the battery, press out the battery from below (press in the direction of the arrow).

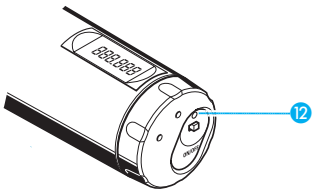


Switching the transmitter on/off

- Turn the protective cap 6 at the bottom of the radiomicrophone so that the ON/OFF button becomes accessible.
- Press the ON/OFF button 11 to switch the transmitter on. The red LED lights up.
- To switch the transmitter off, press the ON/OFF button until "OFF" appears on the display. You can then release the button. The red LED goes off.

Muting the transmitter

Use the MUTE switch to noiselessly mute the transmitter's audio signal (this switch does **not** switch off the transmitter).

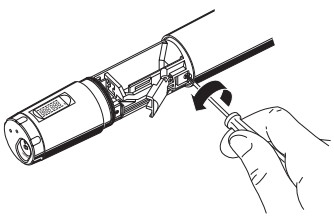


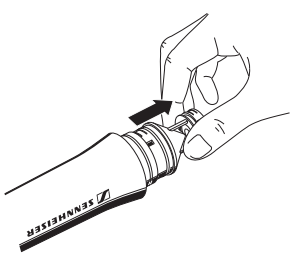
Battery status indication

The red LED ⑫ provides information on the (remaining) battery capacity:

LED lit up:
The transmitter is switched on and the battery capacity is sufficient.

LED flashing:
The battery is going flat! You should immediately replace the battery!





Changing the microphone module

- ▶ First remove the battery and leave the radiomicrophone open.
- ▶ Unscrew the sound inlet basket.
- ▶ Loosen the screw and put it aside.
- ▶ Remove the microphone module, as shown. Do not touch the contacts!
- ▶ Insert the new module, secure the capsule by tightening the screw, put on the suitable sound inlet basket and coloured identification ring and screw it tight.
- ▶ Insert the battery, close the radiomicrophone and put it into operation.

Note:

Microphone module, sound inlet basket and foam insert form an acoustic unit and must therefore always be exchanged all together. Each microphone module comes with a colour-coded identification ring to distinguish different microphone modules from each other (green = MD 835, blue = MD 845, red = ME 865).

6 Operation

Transmitters and receivers of the Sennheiser evolution wireless series ew 100 have been factory-preset to allow immediate use after switch-on (☛ “5 Preparing the devices for use”). Please note, however, that the transmitter sensitivity is dependent on the application. To avoid overmodulation and distortion, please first check whether the preset sensitivity is suitable for your particular application (☛ “Adjusting the sensitivity”).

Operating controls

ON/OFF
POWER

Press the ON/OFF button or the POWER button (EM 100 receiver only) to switch the transmitters and receivers on or off.

MUTE

Use the MUTE switch (transmitters only) to noiselessly mute the audio signal without switching off the transmitter.

SET

Press the SET button
- to select a menu,
- to change to the next menu,
- to return to the top menu level.

▲

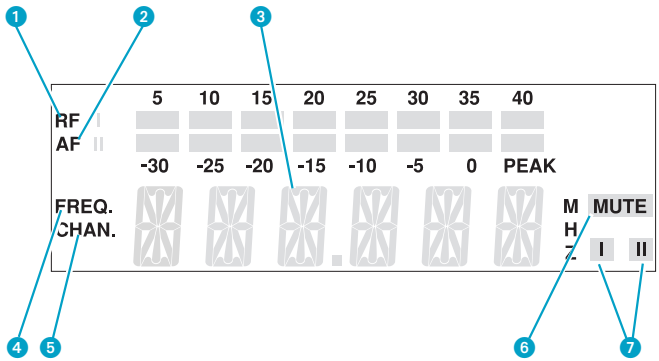
Press the UP button
- to adjust the setting of a menu.

▼

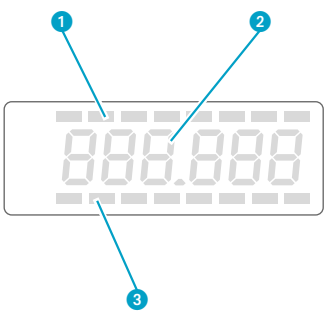
Press the DOWN button
- to adjust the setting of a menu.

LC display panel

EM 100 receiver



1. 8-step level display for incoming RF signal
2. 8-step level display for incoming AF signal, with “PEAK” warning
3. 6-segment alphanumeric main display
4. Display for the “Frequency” menu. (This display can be the receiver’s standard display which always appears after switch-on.)
5. Display for thechannel number “Channel”. (This display can be the receiver’s standard display which always appears after switch-on.)
6. Squelch active (“MUTE”)
7. Diversity display (antenna I or antenna II active)
(☛ “11 Diversity reception”)



EK 100 receiver and SK 100, SKP 100, SKM 100 transmitters

1. 8-step level display for incoming AF signal (EK 100 only)
2. Alphanumeric main display
3. 8-step level display for incoming RF signal (EK 100 only)

Note:

If the operating steps for adjusting the settings via the menu are similar for all devices, only the main display of the EM 100 receiver is depicted.

Basic functions of the Sennheiser operating menu

A special feature of the Sennheiser evolution wireless series ew 100 is the similar operation of transmitters and receivers. In stressfull situations, for example on stage or during a live show or presentation, it is important that the devices are easy to operate and that adjustments to the settings can be made quickly and "without looking". Therefore, the necessary operating steps for each device are similar.

Important:

With the ▲/▼ buttons you can directly switch between the factory-preset frequencies (channels presets). The display starts flashing. Your selection becomes effective immediately.

1. **Press the SET button to enter the top menu level:**

   By briefly pressing SET again, you can change to the next menu. After approx. one second, the selected menu appears on the display and then the current setting of the menu is indicated.

2. **Press the ▼/▲ buttons to adjust the settings of the selected menu:**

   The new setting starts flashing on the display. If you return to the previous setting, the flashing stops.

Important:

New settings become effective immediately and will be retained in memory on switch-off!
N.B.: When changing transmitter frequencies, care should be taken to avoid causing interference to other channels/users.

In the "TUNE" menu, the ▼/▲ buttons feature a "fast search" function. By briefly pressing the ▼/▲ buttons, the display jumps either forwards or backwards to the next setting. If you hold down a button, the cycling of the display is continously accelerted. If you release the button and start over again, the cycling of the display restarts at normal speed. The "fast search" function allows you to get fast and easily to your desired setting.

3. **Press the SET button to return to the top menu level:**

   Have you finished your entries? Press the SET button to return to the top menu level. The display then switches back to the standard setting.

Overview of menus

To ensure that transmitters and receivers of the Sennheiser evolution wireless Series ew 100 are easy to operate, the operating menus have been largely standardised:

Display	Transmitters	Receivers
SEnSit	Adjusting the sensitivity (☛ page 70)	–
SQELCH	–	Adjusting the squelch threshold (☛ page 71)
att	Selecting the sensitivity range (SKP 100 only) (☛ page 71)	–
DISPL DiSPL	Selecting the content of the standard display (☛ page 72)	Selecting the content of the standard display (☛ page 72)
TUNE tune	Setting the transmission frequency (☛ page 73)	Setting the receiving frequency (☛ page 73)
LOCK Loc	Activating the lock-mode function to prevent accidental adjustment (☛ page 74)	Activating the lock-mode function to prevent accidental adjustment (☛ page 74)

Selecting the frequency, channel number

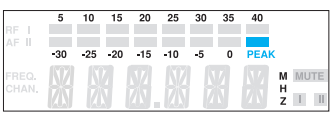
- With the ▲/▼ buttons you can directly switch between the factory-preset frequencies (channel presets). The display starts flashing. **Your selection becomes effective immediately.**
- Press the SET button to acknowledge your selection. The display stops flashing. (If the SET button is not pressed, the receiver will store the new frequency automatically on switch-off.)

Note:

You can choose the content of the standard display i.e. whether the frequency or the channel number is displayed (☛ "Selecting the content of the standard display"). The receiver is factory-preset to show the frequency setting as standard.

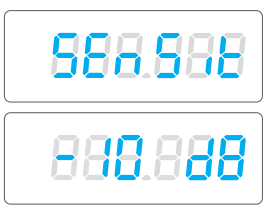
SenSit

Adjusting the sensitvity (transmitters only)



Close talking distances, speakers with loud voices or loud music sequences may cause overmodulation in the transmission link, resulting in distortion. In this case, the "PEAK" warning of the EM 100's AF level display (as well as the SK 100 transmitter's yellow audio peak indication LED) will light up. If, on the other hand, the sensitivity is adjusted too low, the transmission link will be undermodulated, which would result in a signal with high background noise.
The sensitivity has to be adjusted such that the "PEAK" warning of the receiver's AF level display only lights up during the loudest passages.
The following figures are a guide to the best settings:

Loud music/vocals:	-30 / -20 dB
Presentations:	-20 / -10 dB
Interviews:	-10 / 0 dB



- Select the "SEnSit" menu by pressing the SET button until "SEnSit" appears on the display; after a short pause the current sensitivity setting is displayed.
- With the ▲/▼ buttons you can now select a different setting. The sensitivity can be adjusted in 10-dB steps from 0 to -30 dB. The new setting starts flashing on the display and becomes effective immediately.
- Press the SET button to return to the top menu level. The display then switches back to the standard display.

SQELCH
SqELCH

Adjusting the squelch threshold (receivers only)

The Sennheiser evolution wireless series ew 100 receivers are equipped with an adjustable squelch which eliminates annoying noise when the transmitters are switched off. It also suppresses sudden noise when a transmitter leaves the reception area and there is no longer sufficient transmitter power received by the receiver.

- Select the "SQELCH" menu by pressing the SET button until "SQELCH" appears on the display; after a short pause the current squelch setting is displayed.
- With the ▲/▼ buttons you can now select a different setting. The squelch can be switched off (0 dB) or adjusted in 5-dB steps from 5 dB to 40 dB. Selecting a smaller value reduces the squelch threshold, selecting a higher value increases the squelch threshold. The new setting starts flashing on the display. Set the squelch threshold – with the transmitter switched off – to the lowest possible value that suppresses hissing noise. If the squelch threshold is set too high, the transmission range will be reduced.

  Note:

  With the transmitter switched off and the squelch threshold set to "0 dB", hissing noise will occur. With the EM 100 receiver, the "PEAK" warning of AF level bargraph will light up.
- Press the SET button to return to the top menu level. The display then switches back to the standard display.

Att

Selecting the sensitivity range (SKP 100 only)

Condenser microphones require a different sensitivity range than dynamic microphones. With the SKP 100 plug-on transmitter, you can switch the sensitivity range by 20 dB.

- Select the "Att" menu by pressing the SET button until "Att" appears on the display; after a short pause the current setting – i.e. "Att off" or "Att on" – is displayed.
- With the ▲/▼ buttons you can now switch between two different sensitivity ranges.

  ▲: Sensitivity range 1 for dynamic microphones
  – "Att off" flashes on the display

  ▼: Sensitivity range 2 for condenser microphones
  – "Att on" flashes on the display
- Press the SET button to return to the top menu level. The display then switches back to the standard display.

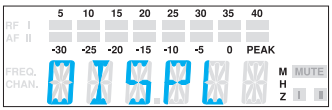
  Note:

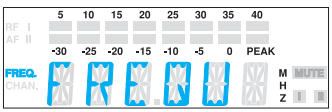
  For recording of quieter signals (e.g. wildlife) with a condenser microphone, you may find it better to set the sensitivity to "Att off".

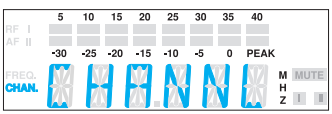
DISPL
DiSPL

Selecting the content of the standard display

With all transmitters and receivers you can choose the content of the standard display i.e. whether the frequency or the channel number is displayed.







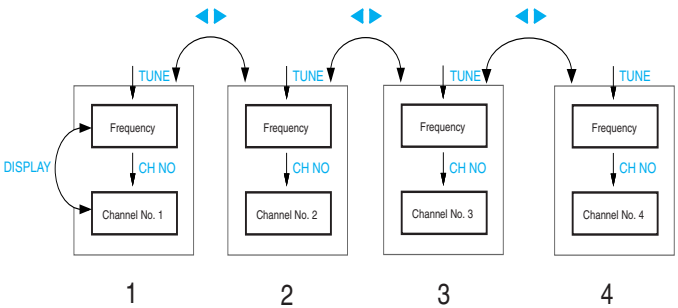
- Select the “DISPL” menu by pressing the SET button until “DISPL” appears on the display; after a short pause the current setting is displayed.
- With the ▲/▼ buttons you can now choose between:

  Channel number: “CHANNL”
  Frequency: “FREQU”

  The new setting for the standard display starts flashing on the display.
- Press the SET button to return to the top menu level. The display then switches to the new standard display.

Configuring a frequency memory

Transmitters and receivers of the Sennheiser evolution wireless series ew 100 have 4 switchable frequencies(channels presets) respectively to store up to 4 transmission/receiving frequencies.



You can directly switch between the channels presets (☛ “Selecting the frequency, channel number”).

TUNE
tune

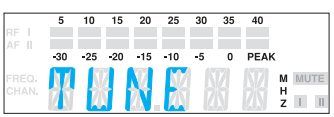
Setting the transmission/receiving frequency

Transmission and receiving frequencies are tunable in 25-kHz steps within a switching bandwidth of 32 MHz max.

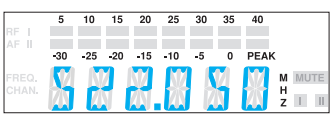
Special notes on multi-channel operation:

Several devices of the Sennheiser evolution wireless series ew 100 can be used simultaneously on different frequencies. The factory-preset frequencies are intermodulation-free. Before you program new frequency combinations, please refer to the information on the correct frequency choice given in the planning brochure “Practical Applications in RF Technology” which your local Sennheiser agent has in stock or will be pleased to order for you from Sennheiser.

- Select the channel preset for which you wish to set a frequency.



- Select the “TUNE” menu by pressing the SET button until “TUNE” appears on the display; after a short pause the currently set frequency is displayed.



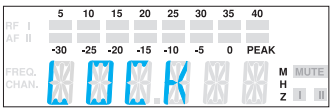
- With the ▲/▼ buttons you can now select a different frequency. The frequencies are tunable in 25-kHz steps. The new frequency starts flashing on the display and becomes effective immediately.
- Press the SET button to return to the top menu level. The display then switches back to the standard display.

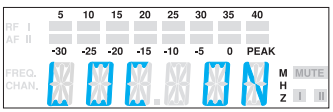
LOCK
Loc

Activating/deactivating the lock-mode function

You can lock the ▲/▼ buttons and the ON/OFF button to prevent accidental programming or switching off during operation.

Activating the lock-mode function





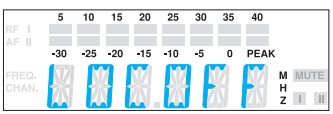
- ► Select the “LOCK” menu by pressing the SET button. The current setting is indicated on the display.
- ► Press the ▲ button to activate the lock-mode function. “LOC ON” starts flashing on the display.
- ► Press the SET button to return to the top menu level.

Note:

If you press the ▲/▼ buttons or the ON/OFF button, “LOCK” appears on the display and the buttons are now locked.

Deactivating the lock-mode function

- ► Select the “LOCK” menu by pressing the SET button. “LOC ON” appears on the display.



- ► Press the ▼ button to deactivate the lock-mode function. “LOC OFF” begins to flash on the display.
- ► Press the SET button to return to the top menu level. The display switches back to the standard display and the buttons can now be operated as usual.

7 Troubleshooting

Error checklist

Problem	Possible cause
No operation indication	• Batteries are flat • No mains connection
No RF signal	• Transmission frequency is not the same as the receiving frequency • Transmitter is out of range
RF signal available but no audio signal	• Transmitter is muted (“MUTE”) • Receiver’s squelch threshold adjusted too high
Audio signal has a high level of background noise	• Transmitter sensitivity adjusted too low • Receiver’s AF output level adjusted too low
Audio signal distorted	• Transmitter sensitivity adjusted too high • Receiver’s AF output level adjusted too high

► If problems occur that are not listed in the above table, please contact your local Sennheiser agent for assistence.

Recommendations and tips

... for the ME 2 and ME 4 clip-on microphones

- To reduce level variations to a minimum when the user turns his or her head away from the microphone, attach the microphone as centrally as possible.
- To protect the microphone against excessive sweat/moisture, avoid direct skin contact.
- Attach the microphone carefully and conduct the cable such that noise due to friction is avoided.
- Always use the ME 4 directional microphone with a windshield and direct the microphone towards the sound source (e.g. mouth).

... for the ME 3 headmic

- Always use the microphone with a popshield and position the microphone at the corner of the mouth.
- You can vary the bass reproduction by increasing/decreasing the talking distance.
- Make sure that the sound inlet is directed towards the mouth. The sound inlet is marked with a little dot.

... for the SK 100 pocket transmitter

- Make sure that the antenna and the microphone cable do not cross.
- The antenna should hang freely and be at least 1 cm away from the body. The antenna must not be in direct contact with the skin.
- For best results, make sure that the transmitter sensitivity is correctly adjusted.

... for the SKM 100 hand-held transmitter

- Hold the SKM 100 hand-held transmitter in the middle of the microphone body. Holding it close to the sound inlet basket will influence the microphone's pick-up pattern, holding it at the lower part of the body will reduce the transmitter's range.
- You can vary the bass reproduction by increasing/decreasing the talking distance.
- For best results, make sure that the transmitter sensitivity is correctly adjusted.

... for the EK 100 receiver

- The antenna should hang freely and be at least 1 cm away from the body. The antenna must not be in direct contact with the skin. If the receiver is mounted onto a camera, we recommend using the A 17 helical antenna.

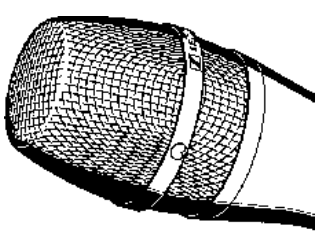
... for optimum reception

- Transmission range depends to a large extent on location and can vary from about 10 m to about 150 m. There should be a “free line of sight” between transmitting and receiving antennas.
- If, with the EM 100 receiver, reception conditions are unfavourable, you should use two remote antennas which are connected via antenna cable (☛ “Accessories”).
- To avoid overmodulating the receiver, observe a minimum distance of 5 m between transmitting and receiving antennas.
- Observe a minimum distance of 50 cm between receiving antennas and metal objects (such as cross members or reinforced-concrete walls).

... for multi-channel operation

- You cannot use all adjustable frequency combinations simultaneously. The factory-preset frequencies (presets), however, are intermodulation-free. If you wish to program new frequency combinations, please contact your local Sennheiser agent who will provide you with information on the correct frequency choice.
- When using several transmitters simultaneously, interference can be avoided by maintaining a minimum distance of 20 cm between two transmitters.
- Use special accessories for multi-channel applications (☛ “Accessories”).

8 Care and maintenance



SKM 100 hand-held transmitter

The SKM 100’s sound inlet basket should be cleaned from time to time.

▶ Unscrew the inlet basket (turn counter-clockwise) and remove it.

▶ Use a damp cloth to clean the inlet basket from the inside and outside.

Note:

Do not use any cleasing agents or solvents. Do not touch the microphone’s contacts.

▶ Replace the inlet basket on the SKM 100 and screw it tight (taking care not to loose the coloured identification ring).

9 Overview

Wireless transmission systems

With the evolution wireless series, Sennheiser puts an end to cable tangles and enables complete freedom of movement at an affordable price.

The systems operate exclusively in the UHF band. UHF transmission is extremely reliable and is far less prone to interference than the overcrowded VHF band – harmonics from mains units, fluorescent tubes, refrigerators, computers, etc. are virtually eliminated. Also indoor propagation of UHF radio waves is better than VHF so that the RF power can be kept low – this is also an advantage when using multi-channel systems. Finally, UHF frequency ranges are being approved all over the world for radiomicrophone usage – in some countries licence-free.

There are three transmitter versions: The **hand-held transmitter** is a complete radiomicrophone in a single unit, the **plug-on transmitter** converts your favourite dynamic wired microphone into a radiomicrophone, the **pocket transmitter** can accept a wide range of inputs including: omni-directional or cardioid "tie" microphones, head-worn microphone, guitar/ instrument direct input and auxiliary devices via the optional CL 2 line input cable.

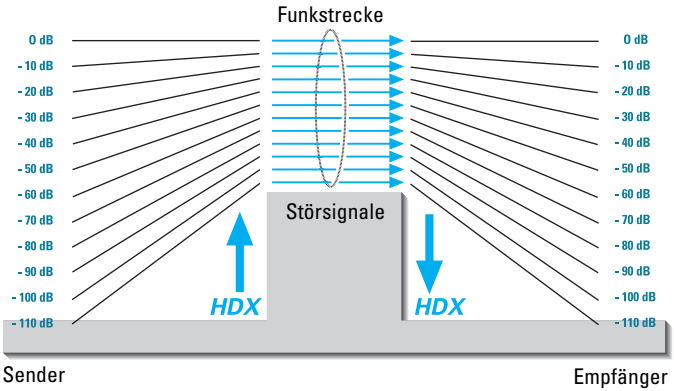
Fresh batteries ensure good transmission power during operation. Always use alkaline batteries for best operation – a 9V PP3 battery has a much longer operating time than a NiCd rechargeable battery (approx. 8 hours with a 9V PP3 or 1 hour with a rechargeable).

Correct adjustment of transmitter sensitivity is vital. Too high and you get overmodulation and distortion, too low and you get undermodulation and a noisy signal. Please set the sensitivity correctly for the microphone/usage and check it before every performance to ensure best operation.

Sennheiser miniature clip-on microphones can be attached in various ways: they can, for example, be attached to the hairline or to clothing (e.g. tie or lapel). However it is fixed, please make sure that the microphone is protected against sweat/moisture and make-up.

Interference such as distortion, hissing or "birdying" may occur if several transmitters are used together and the frequencies have not been correctly chosen. Sennheiser standard frequencies (as supplied) are all intermodulation-free. For other frequency sets please contact your local Sennheiser agent, who will be able to provide you with information on correct frequency choice and/or be able to calculate special frequency sets for you.

HDX noise reduction



Progress you can hear:

The evolution wireless Series is equipped with **HDX**, the new Sennheiser noise reduction system that reduces RF interference. It increases the signal-to-noise radio in wireless audio transmission to up to 110 dB.

HDX is a wideband compander system which compresses the audio signal in the transmitter in a 2:1 ratio (related to dB) to lift it above the inherent noise floor of the RF link. A 110 dB dynamic range signal is thus transmitted with an effective dynamic range of only 55 dB, which is above the 60 dB noise floor of the RF link. In the receiver the signal is expanded in an identical and opposite way in a 1:2 ratio to restore the original signal, at the same time reducing the RF noise to below the noise floor of the receiver. Giving a radio link with a better signal-to-noise ratio than a CD.

HDX has been specially developed for high quality radiomicrophone systems.

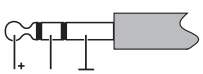
Note:

Only transmitters and receivers that are equipped with **HDX** can work correctly with each other. If non **HDX** equipment was mixed with **HDX**, the dynamic range would be drastically reduced and the transmission would sound blunt and flat. **HDX** is permanently active and cannot be switched off.

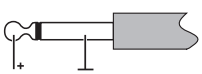
Connector assignment

$^1/_4$" (6.3 mm) stereo jack plug (EM 100)

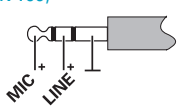
balanced



unbalanced

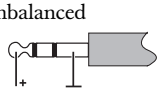


3.5 mm stereo jack plug (lockable) (SK 100)



3.5 mm stereo jack plug (lockable)

unbalanced



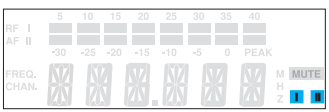
DC connector/Power supply

Diversity reception

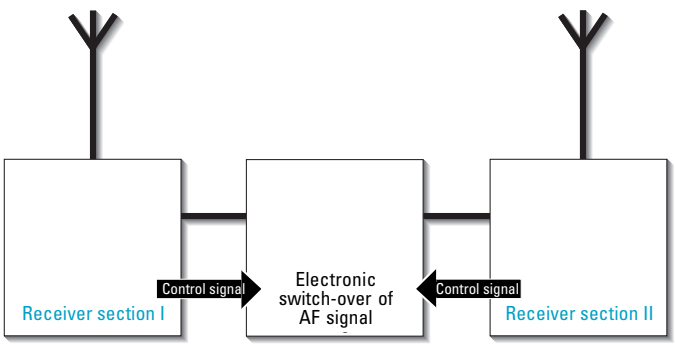
The EM 100 receiver operates on the “true diversity” principle:

A receiving antenna receives not only the electromagnetic waves which reach it by a direct path, but also the reflections of these waves which are created in the room by walls, windows, ceilings and fittings. When these waves are superimposed, destructive interference occurs, which can also be called “field strength gaps”. Repositioning the receiving antenna can bring a solution, provided the transmitter remains in its original position. With mobile transmitters, however (which all radiomicrophones are), the “field strength gap” will then occur with a different transmitter position. These “field strength gaps” can only be eliminated with true diversity receivers.

In true diversity, instead of one antenna and one receiver there are now two antennas and two receiver sections. The antennas are spatially separated. By means of a comparison circuit, the receiver section with the strongest RF signal is always switched to the common AF output. The risk of the occurrence of “field strength gaps” in both antennas at the same time is virtually nonexistant.



The receiver display panel shows the active diversity section (I or II).



Technical data

System

RF characteristics

Modulation	wideband FM
Frequency ranges	518 – 550, 630 – 662, 740 – 772, 790 – 822, 838 – 870 MHz
Transmission/receiving frequencies	1280, tunable in steps of 25 kHz 4 switchable channels
Switching bandwidth	32 MHz
Frequency stability	≤ ± 15 ppm

AF characteristics

Noise reduction system	Sennheiser HDX
Nominal/peak deviation	± 24 kHz / ≤ ± 48 kHz
AF frequency response	60 – 18,000 Hz
Signal-to-noise ratio at 1 mV_{RF} and peak deviation, HDx	≥ 110 dB(A)
THD at nom. deviation and 1 kHz	≤ 0.9 %

Overall device

Temperature range	-10°C ... +55°C
Dimensions Carrying case [mm]	380 x 370 x 70
Weight Carrying case with EM 100	approx. 3100 g
Carrying case with EK 100	approx. 2200 g
In compliance with	ETS 300 422, ETS 300 445 (CE), FCC

Receiver

RF characteristics	EM 100	EK 100
Receiver principle	true diversity	non-diversity
Sensitivity (with HDX, peak deviation)	< 2.5 µV at 52 $dB_{Arms\ S/N}$	
Squelch treshold	0–100 µV, adjustable	
Antenna inputs	2 BNC sockets	M3 thread
Antenna length [mm]	Telescopic antennas	518–550 MHz: 130 630–662 MHz: 110 740–772 MHz: 90 790–822 MHz: 90 838–870 MHz: 80
Antenna input impedance	50 Ω	

AF characteristics

AF output voltage at peak deviation 1 kHz_{AF}		
AF OUT	$^1/_4$" (6.3 mm) jack socket: balanced: +10 dB_u unbalanced: +4 dB_u	3.5 mm jack socket: unbalanced: +10 dB_u
Level adjustment	0 – 40 dB	

Overall device	EM 100	EK 100
Power supply	10.5–16 V DC, nominal voltage 12 V DC	9 V PP3 battery (IEC 6 LR 61)
Power consumption (operating time)	≤ 200 mA	≤ 75 mA (4–6 h)
Dimensions [mm]	212 x 145 x 38	110 x 65 x 22
Weight	approx. 1100 g	approx. 255 g

Transmitters

RF characteristics	SK 100	SKP 100	SKM 100
RF output power at 50 Ω	typ. 30 mW		
Antenna length [mm]	518 – 550 MHz: 130 630 – 662 MHz: 110 740 – 772 MHz: 90 790 – 822 MHz: 90 838 – 870 MHz: 80		

AF characteristics				
Max. input voltage (at peak dev., 1 kHz_{AF})	MICRO:	1.8 V_{rms}	2.9 V_{rms}	–
	LINE:	2.4 V_{rms}		

Overall device			
Power supply	9 V alkaline PP3 battery (IEC 6 LR 61)		
Max. power consumption at nom. voltage	≤ 60 mA		
Operating time	> 8 h	> 8 h	> 8 h
Dimensions [mm]	110 x 65 x 22	105 x 43 x 43	Ø 50 x 225
Weight	approx. 255 g	approx. 195 g	approx. 450 g

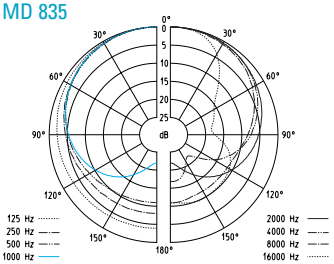
Microphones

	ME 2	ME 3	ME 4
Transducer principle	condenser	condenser	condenser
Sensitivity	20 mV/Pa	1.6 mV/Pa	40 mV/Pa
Sound pressure	130 dB SPL	150 dB SPL	120 dB SPL
Pick-up pattern	omni-directional	super-cardioid	cardioid

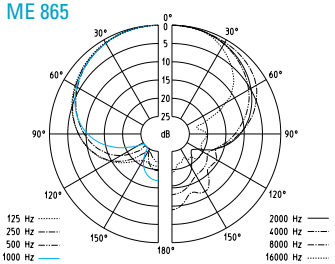
	MD 835	MD 845	ME 865
Transducer principle	dynamic	dynamic	condenser
Sensitivity	1.5 mV/Pa	1 mV/Pa	3 mV/Pa
Sound pressure	150 dB SPL	154 dB SPL	144 dB SPL
Pick-up pattern	cardioid	super-cardioid	super-cardioid

Polar diagrams of microphones/microphone modules

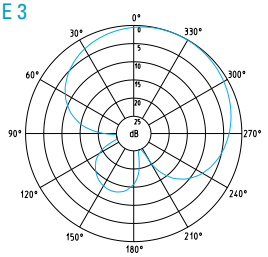
MD 835



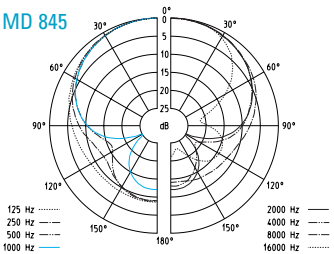
ME 865



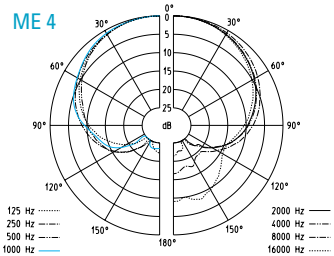
ME 3



MD 845

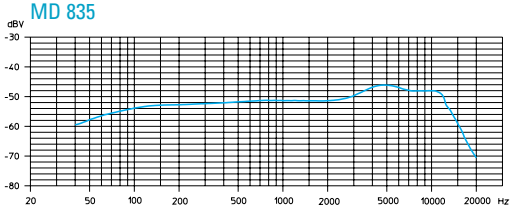


ME 4

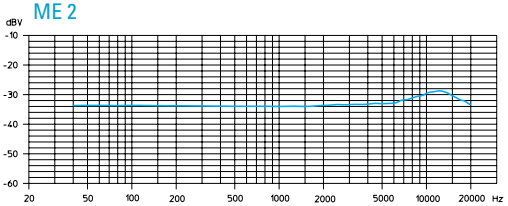


Frequency response curves of microphones/microphone modules

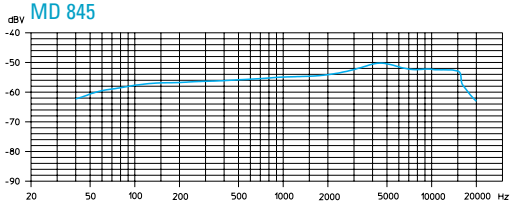
MD 835



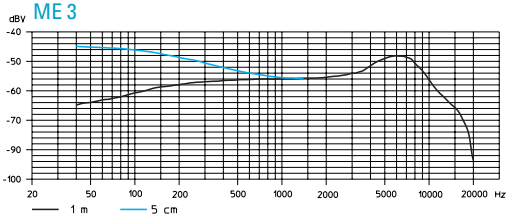
ME 2



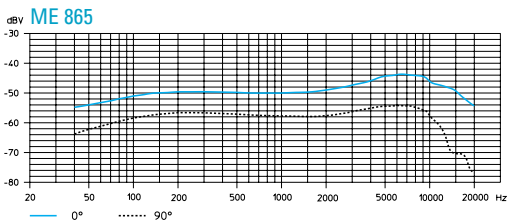
MD 845



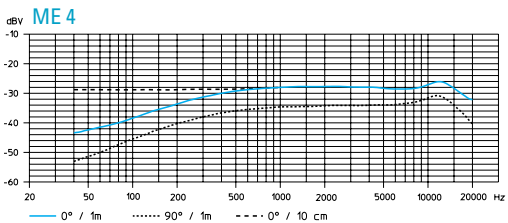
ME 3



ME 865



ME 4



Accessories

MD 835	Microphone module for SKM 100, dynamic, cardioid	
MD 845	Microphone module for SKM 100, dynamic, super-cardioid	
ME 865	Microphone module for SKM 100, condenser, super-cardioid	
MZW 1	Wind- and popshield for SKM 100,	
MZQ 1	Microphone clamp for SKM 100	
ME 2	Clip-on microphone for SK 100, condenser, omni-directional	
ME 4	Clip-on microphone for SK 100, condenser, cardioid	
ME 3	Headmic for SK 100, condenser, super-cardioid	
CI 1	Instrument cable for SK 100, with $^1/_4$" (6.3 mm) jack plug	
CL 2	Line input cable for SK 100, with female 3-pin XLR connector	
GA 1	19" rack adaptor for EM 100, for mounting two EM 100/ASP 1 or one EM 100/ASP 1 with AM 1 into a 19" rack	
AM 1	Antenna mount for connecting antennas to the front of the GA 1	
A 1031-U	UHF antenna, passive, omni-directional, can be mounted onto a stand	
AB 1-A AB 1-B AB 1-C AB 1-D AB 1-E	UHF antenna booster, 10 dB gain (powered via ASP 1/NT 1)	518–550 MHz 630–662 MHz 740–772 MHz 790–822 MHz 838–870 MHz
GZL 1019-A1 / 5 / 10	Antenna cable with BNC connectors	1 m / 5 m / 10 m
ASP 1	Antenna splitter 2 x 1:4, passive, for connecting four EM 100 to two A 1031-U/AB 1	
NT 1	Plug-in mains unit for ASP 1 (to power four receivers and two AB 1)	

DC 1	DC power adaptor, for external 12 V DC powering of SK/EK 100 (instead of 9 V PP3 battery)	
A 17-1	Helical antenna for EK 100,	518–662 MHz
A 17-2	for use with cameras	740–870 MHz
CC 1	Carrying case for SET ew 100	